In the Claims

The following Listing of Claims replaces all prior versions in the application:

LISTING OF CLAIMS

1.   (Currently amended)   A headend cherrypicker that implements TIVO functions, comprising:

a packet switch;

a plurality of video servers and satellite feed servers coupled to supply MPEG packets encoding a plurality of video programs;

a hard disk array storing MPEG packet video data encoding TIVO-like function menus and for storing MPEG packet video data to record programs for which a customer has requested recording;

an IP wrapper circuit functioning to receive said MPEG packets from said plurality of video servers and said hard disk array and encapsulate them in IP multicast packets and encapsulate the IP multicast packets in local area network (LAN) packets having station addresses that correspond to said program identifier data and supplying said LAN packets to said switch;

a cable modem termination system and cable modem for coupling to a hybrid fiber coaxial cable transmission medium (HFC) for transmitting iData and command and control data downstream to customers and for receiving commands from each customer to order video programs including recorded programs or TIVO menus and to control TIVO functions performed for that customer;

one or more network cherrypickers and transmitter combinations coupled to said switch, each said transmitter coupled to said HFC for transmitting said requested programs, recorded programs or TIVO menus to one or more customers;

a system control computer programmed to exchange data with said switch and control routing by said switch to receive upstream requests for video programs and TIVO function

commands and assign one or more logical channels on said HFC to each requested video program, recorded program or menu and to route data encoding requested video programs from one or more of said video servers and recorded programs or TIVO function menus from said hard disk array to one or more network cherrypicker and transmitter combination for transmission to the customer that requested the data, and to route a downstream message to from said cable modem to said customer indicative of telling the customer on which logical channel the requested data will be arriving on and for routing data encoding video programs to be recorded to said hard disk array.

2. (Original) The apparatus of claim 1 further comprising at least one web server coupled to said switch through an IP wrapper circuit and which outputs to said IP wrapper circuit IP format packets encapsulated in MPEG packets having a PID which identifies the source of the iData, and wherein said system control computer is programmed to control said switch to use said cable modem termination system and said cable modem to provide broadband internet access to customers.

3. (Original) The apparatus of claim 1 further comprising one or more game servers which output game data in MPEG packets to an IP wrapper circuit coupled to said switch, and wherein said system control computer controls said switch to send and receive game data packets to and from customers who are, at their premises, playing games resident on said game server.

4. (Original) The apparatus of claim 1 further comprising one or more EMM servers, electronic program guide servers, Tmail servers or data carousel servers for sending and receiving MPEG packets encapsulating iData to one or more customers through one or more IP wrapper circuits and said packet switch and one or more of said cherrypicker and transmitter combinations, and wherein said control computer is programmed to control said switch to facilitate said exchanges of data with said customers.

5. (Original) The apparatus of claim 1 further comprising one or more transcoder servers coupled to said packet switch for altering the data rate of incoming packets in accordance

with rate shaping commands and for outputting to said switch rate shaped data, and wherein said system control computer is programmed to route data encoding requested video programs, TIVO function menus, or iData to one or more of said transcoder servers and to control said one or more transcoder servers with rate shaping commands to alter the data rate of said data to a data rate that matches the available bandwidth to transmit said data to a customer, and to control said switch to route the rate shaped data to one or more network cherrypicker and transmitter combinations for transmission to the customer that requested the data on the assigned logical channel.

6.   (Original)   A headend cherrypicker that implements TIVO functions, comprising:
a packet switch;

a plurality of video servers and satellite feed servers coupled to supply MPEG packets encoding a plurality of video programs;

a plurality of personal video recorder servers, each for implementing TIVO functions for one or more customers by outputting MPEG packets encoding TIVO function menus and prerecorded programs and for receiving and recording MPEG packets encoding video programs to be recorded for each customer;

an IP wrapper circuit functioning to receive said MPEG packets from said plurality of video servers and said personal video recorder servers and encapsulate them in IP multicast packets and encapsulate the IP multicast packets in local area network (LAN) packets having station addresses that correspond to said program identifier data and supplying said LAN packets to said switch;

a cable modem termination system and cable modem for coupling to a hybrid fiber coaxial cable transmission medium (HFC) or one or more DSL modems for coupling to one or more DSL lines or a satellite uplink and downlink modem for coupling to a satellite dish, said modem for transmitting iData and command and control data downstream to customers and for receiving commands from each customer to order video programs including recorded programs or TIVO menus and to control TIVO functions performed by said one or more personal video recorder servers for that customer, said HFC, one or more DSL lines or satellite dish hereafter referred to as the transmission medium;

one or more network cherrypicker and transmitter combinations coupled to said switch, each said transmitter coupled to said transmission medium for transmitting said requested programs, recorded programs or TIVO menus to one or more customers;

one or more transcoder servers coupled to said packet switch for altering the data rate of packets sent to said transcoder servers to a different data rate in accordance with rate shaping commands;

a system control computer programmed to exchange data with said switch and control routing by said switch to receive upstream requests for video programs and TIVO function commands and assign one or more logical channels on said transmission medium to each requested video program, recorded program or menu and to route data encoding requested video programs from one or more of said video servers and recorded programs or TIVO function menus from said one or more personal video recorder servers to one or more of said transcoder servers and to control said one or more transcoder servers with rate shaping commands to alter the data rate of said data to a data rate that matches the available bandwidth to transmit said data to a customer, and to control said switch to route the rate shaped data to one or more network cherrypicker and transmitter combinations for transmission to the customer that requested the data, and to route a downstream message to said cable modem to said customer telling the customer on which logical channel the requested data will be arriving and for routing data encoding video programs to be recorded to said one or more personal video recorder servers.

7.   (Original)   The apparatus of claim 6 further comprising at least one web server coupled to said switch through an IP wrapper circuit and which outputs to said IP wrapper circuit IP format packets encapsulated in MPEG packets having a PID which identifies the source of the iData, and wherein said system control computer is programmed to control said switch to use said cable modem termination system and said cable modem to provide broadband internet access to customers.

8.   (Original)   The apparatus of claim 6 further comprising one or more game servers which output game data in MPEG packets to an IP wrapper circuit coupled to said switch, and

wherein said system control computer controls said switch to send and receive game data packets to and from customers who are, at their premises, playing games resident on said game server.

9.   (Original)   The apparatus of claim 6 further comprising one or more EMM servers, electronic program guide sewers, Tmail servers or data carousel servers for sending and receiving MPEG packets encapsulating Data to one or more customers through one or more IP wrapper circuits and said packet switch and one or more of said cherrypicker and transmitter combinations, and wherein said control computer is programmed to control said switch to facilitate said exchanges of data with said customers.